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APPLICANT : HITACHI METALS LTD;

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TITLE : HEAT TREATMENT OF GALLIUM ARSENIDE SINGLE CRYSTAL

ABSTRACT : PURPOSE: To uniformize the electrical characteristics of a gallium arsenide single crystal by heating the ingot of the gallium arsenide single crystal to a high temp. under specific heating conditions, then cooling the entire part of the crystal.

CONSTITUTION: The ingot of the gallium arsenide single crystal is held for 2~20hr at 1,100~1,200°C and is heated to the high temp., following which the entire part of the crystal is heat-treated. This heat treatment is executed by holding the single crystal for 2~20hr at 1,100~1,200°C in a arsenic atmosphere in order to annihilate the defects which are formed during the growth of the ingot and are the cause for a dep energy level. Heating of the ingot to  $\geq 1,200^{\circ}\text{C}$  is undesirable as the ingot is heated nearly to the m.p. The deep energy level is generated again when the ingot heated to the high temp. is cooled. The entire part of the crystal is, therefore, heated uniformly and the rate of the cooling is preferably set at  $-20\sim 200^{\circ}\text{C/hr}$ . The concn. of the defects which are the cause or the deep energy level is controlled by cooling the ingot at said cooling rate.

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